

CLAIMS

1. A semiconductor device comprising:

a substrate;

5 a semiconductor chip mounted on the substrate;

external electrodes provided on the back of the substrate, for connecting electrodes of the semiconductor chip to the outside;

10 a sealing member for encapsulating the semiconductor chip on the substrate; and

a heat sink plate fixed by the sealing member, wherein

15 the heat sink plate has concavo-convex portions formed on an exposed surface thereof and is disposed so as to be opposed to a main surface on which semiconductor elements of the semiconductor chip are formed.

2. The semiconductor device according to claim 1, wherein the heat sink plate is formed so that the convex portions protrude from the surface of the sealing member to
20 the outside.

3. The semiconductor device according to claim 1, wherein the heat sink plate is disposed so as to adjoin the main surface with a thin sealing member placed on the main surface of the semiconductor chip being interposed
25 therebetween.

4. The semiconductor device according to claim 3, wherein the heat sink plate is formed so that the convex portions protrude from the surface of the sealing member to the outside.

5. The semiconductor device according to claim 1, wherein the heat sink plate is disposed so as to make contact with the main surface used for the semiconductor elements.

5 6. The semiconductor device according to claim 5, wherein the heat sink plate is formed so that the convex portions protrude from the surface of the sealing member to the outside.

7. A semiconductor device, comprising:

10 a substrate;
 a semiconductor chip mounted on the substrate;
 external electrodes provided on the back of the substrate, for connecting electrodes of the semiconductor chip to the outside;

15 a sealing member for encapsulating the semiconductor chip on the substrate; and

 a heat sink plate fixed by the sealing member, wherein

20 the heat sink plate has a heat dissipation fin formed integrally therewith.

8. The semiconductor device according to claim 7, wherein the heat sink plate and the heat dissipation fin have engaging portions brought into engagement with each other, whereby the engaging portions allow detachment of
25 the heat dissipation fin from the heat sink plate.

9. The semiconductor device according to claim 8, wherein the engaging portions are respectively formed at the heat sink plate and the heat dissipation fin and comprise a screw and a threaded hole brought into

engagement with each other.

10. The semiconductor device according to claim 7,
wherein the heat sink plate is disposed so as to be opposed
to a main surface on which semiconductor elements of the
5 semiconductor chip are formed.

11. The semiconductor device according to claim 10,
wherein the heat sink plate and the heat dissipation fin
have engaging portions brought into engagement with each
other, whereby the engaging portions allow detachment of
10 the heat dissipation fin from the heat sink plate.

12. The semiconductor device according to claim 11,
wherein the engaging portions are respectively formed at
the heat sink plate and the heat dissipation fin and
comprise a screw and a threaded hole brought into
15 engagement with each other.